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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/808,813	03/15/2001	Toshiaki Shimada	OCW-003	6330

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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 12/24/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/808,813

Applicant(s)

SHIMADA, TOSHIAKI

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

2. The drawings have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the drawings.

Specification

3. The disclosure is objected to because of the following informalities:
 - On page 10, line 14, “MH1” should be changed to -- MH2 -- for proper reference to the drawings (FIG. 2).
 - On page 14 line 2, “litters” should be changed to -- liters --.
 - On page 15 line 12, “the third flowmeter 52” should be changed to -- the fourth flowmeter 52 --, as set forth on page 13 line 7 and the drawings.

Appropriate correction is required.

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claim 1, "the deteriorated hydrogen-occlusion alloy" (lines 6-7) lacks proper positive antecedent basis.

With respect to claim 5, "the regenerating treatment" (line 7) lacks proper positive antecedent basis. Furthermore, it is unclear as to the relationship of "a detection signal" (lines 5-6) to the detection signal set forth in claim 1, lines 7-8 (it is suggested to change "a detection signal" to -- a second detection signal --).

With respect to claim 6, the language of the claim is directed to a method limitation, which renders the claim vague and indefinite as it is unclear as to what structural elements the applicant is attempting to recite since "the hydrogen released" (line 2) is not an element of the apparatus.

With respect to claim 7, the phrase "type" (line 3) renders the claim indefinite because the claim includes elements not actually disclosed (those encompassed by "type"), thereby rendering the scope of the claim unascertainable. Furthermore, "high" and "low" are vague and indefinite, as they are relative terms.

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With respect to claim 8, it is unclear as to where the body of the claim begins.

Furthermore, “the remaining amount of hydrogen-occlusion” (lines 12-13) lacks proper positive antecedent basis.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-2, 4-5 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Imoto et al. (JP 08-094610).

With respect to claim 1, Imoto et al. disclose a hydrogen-occlusion alloy regenerating apparatus (Note entire reference, especially Figures, Abstract, sections [0014]-[0015]) comprising:

A deterioration detection means (i.e. mass-flow meter 4) for detecting that a hydrogen-occlusion alloy 1 or 2 capable of occluding hydrogen and releasing hydrogen has been deteriorated due to the deposition of impurities, and a regenerating section 8 or 9 for regenerating the deteriorated hydrogen-occlusion alloy 1 or 2 based on a detection signal from the deterioration detecting means 4. According to the specification, page 13 lines 7-10, “the fourth flow meter 52 has a function as a deterioration detection means.” Therefore, the mass-flow meter 4 of Imoto et al. meets the claim.

With respect to claim 2, Imoto et al. further disclose said deterioration detecting means 4 detects an amount of hydrogen occluded in said hydrogen-occlusion alloy 1 or 2 (i.e. “the

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effective amount of hydrogen movement”; Abstract), and sends the detection signal (via control unit 6) if the amount of hydrogen occluded is smaller than an amount of hydrogen occluded when the hydrogen occlusion alloy is normal.

With respect to claim 4, Imoto et al. further disclose said regenerating section 8 or 9 includes a heating means (i.e. heater 8 or 9; FIG. 1; section [0012], [0014]-[0015]) which heats the hydrogen-occlusion alloy 1 or 2, based on the detecting signal from the deterioration detecting means 4, to release hydrogen remaining in the hydrogen-occlusion alloy in order to remove, by the release hydrogen, impurities from the hydrogen-occlusion alloy 1 or 2 deteriorated due to the deposition of impurities. According to the specification, page 15 lines 8-10, the “heating circuit 56 associated with the second storage section 51 is used also as the heating means.” Therefore, “heater (8) and (9)... operated by setting a power circuit (7) to ON...” (section [0015]) meets the claim.

With respect to claim 5, Imoto et al. (Figures, Abstract, sections [0016]-[0025]) further disclose said regenerating section 8 or 9 includes a remaining-amount detecting means 4 for detecting a remaining amount of hydrogen occluded (i.e. based on the “degradation rate R”) in the hydrogen-occlusion alloy 1 or 2, the remaining-amount detecting means 4 sending a detection signal (via control unit 6) when the remaining amount of hydrogen occluded has reached such an amount that the regenerating treatment (i.e. Step S10) is required for said hydrogen-occlusion alloy 1 or 2, and said heating means (i.e. heater 8 or 9) heats the deteriorated hydrogen-occlusion alloy 1 or 2 based on both the detection signals from the remaining-amount detecting means 4 and the deterioration detecting means 4. According to the specification, page 15 lines 2-7, “the fourth flowmeter 52 functions as a remaining-amount detecting means”, thus

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substantially the “deterioration detection means” above. Therefore, the mass-flow meter 4 of Imoto et al. meets the claim.

With respect to claim 8, the same comments apply. For “a deterioration detecting means”, see comments in claim 1 above; “a remaining-amount detecting means”, see comments in claim 5 above; and “a heating means”, see comments in claims 4-5 above.

Instant claims 1-2, 4-5 and 8 read structurally on the apparatus of Imoto et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imoto et al. (JP 08-094610).

With respect to claim 3, although Imoto et al. is silent as to specifically a “rate of occlusion”, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the “rate of occlusion” by merely dividing “the effective amount of

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hydrogen movement”, as detected by the deterioration detecting means 4 above, by the operating time. With respect to claim 4 (depending from claim 3), the same comments apply.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imoto et al. (JP 08-094610) in view of Gamo et al. (U.S. 5,976,725).

Although Imoto et al. are silent as to whether or not the hydrogen released from said hydrogen occlusion alloy may be utilized for operating a fuel cell, the incorporation of hydrogen storage devices such as hydrogen occlusion alloys with fuel cell power generation systems is known in the art, as evidenced by Gamo et al.

Gamo et al. teach a fuel cell system wherein a hydrogen occlusion alloy 2 is used to supply hydrogen fuel to the fuel cell 1 (FIG. 1). It would have been obvious for one of ordinary skill in the art at the time the invention was made to utilize the hydrogen released from the hydrogen occlusion alloy for operating a fuel cell because hydrogen occlusion alloys provide a portable and safe means of providing fuel since operating pressure can be kept low (column 11, lines 26-28), as taught by Gamo et al. Gamo et al. further cite the conventionality of combining fuel cells with hydrogen occlusion alloys in fuel cell systems (column 1, lines 22-26).

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imoto et al. (JP 08-094610) in view of Sato et al. (JP 06-193996).

Although Imoto et al. only disclose the use of $\text{LaNi}_{4.55}\text{Al}_{0.45}$ and $\text{Mm}_{0.9}\text{Y}_{0.1}\text{Ni}_{4.9}\text{Mn}_{0.1}$ metal alloys, they further cite that the gas-detection equipment of the invention is applicable to combinations of other kinds of alloy systems (section [0037]). The use of alloy systems of the high-pressure occluding/low-temperature releasing type is known in the art of hydrogen storage,

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as evidenced by Sato et al. As shown in FIG. 5, the alloy system designated as "MH2" is of a high-pressure occluding/low temperature releasing type, with the transfer of hydrogen indicated by lines c and d. Therefore, it would have been obvious design choice for one of ordinary skill in the art at the time the invention was made to select a high-pressure occluding/low-temperature releasing type alloy, depending on the intended use of the apparatus and absent showing unexpected results.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Kanazawa and Yabe are presented to illustrate the state of the art.

* * *

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer A. Leung *JAL*
December 17, 2002

Hien Tran
HIEN TRAN
PRIMARY EXAMINER